Problem Wk.5.2: Nano Quiz

Due date: 3/3, 9:50am

Do all parts of this problem and then click Submit. There is only one Submit button, you should only do that when you are finished with all the parts of the problem.

Do not try to start another log in, you will lose what you typed.

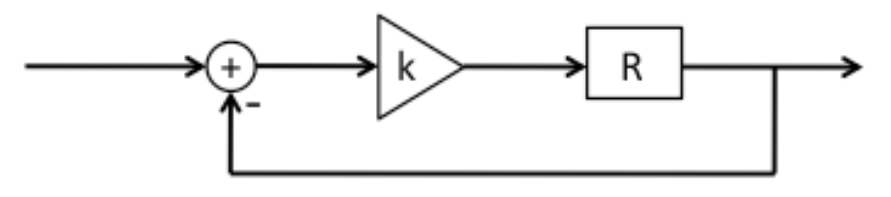
There is a limited checking budget (15 checks) on this quiz.

You have 15 minutes. You must click submit before:

3/3, 9:50am

Part 1: Feedback

Consider the following system



1. Write the system function for the system above.

   The system function is represented by the numerator and denominator polynomials.

   Enter each coefficient as a Python arithmetic expression, possibly involving the parameter `k`. 0 is a valid answer.

   Checks in this problem are very slow, so you should minimize the number of checks.

   System function:

   numerator: $\square R^2 + \square R + \square$

   denominator: $\square R^2 + \square R + \square$

2. What are the poles for this system? Enter the real and imaginary parts in the boxes below.

   If there are no poles, enter `none` in all the boxes. If there is one pole, enter a

Python arithmetic expression expression (in term of the parameter `k`) in the top pair of boxes and `none` in the bottom pair of boxes. If there are two poles enter Python expressions in all four boxes.

You can use `sqrt(...)` in your expressions to represent the positive square root, use `-sqrt(...)` for the negative square root. Enter poles with positive square roots in the top boxes and with negative square roots in the bottom boxes.

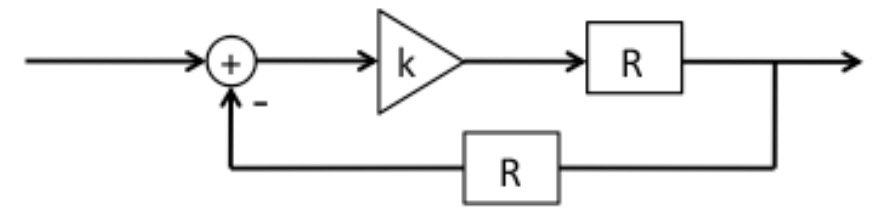
	real part	imaginary part
pole 1		
pole 2		

3. For what real values of `k` is this system stable (consider a pole with magnitude 1 not stable)? Enter a number, `Inf` for infinity or `-Inf` for negative infinity or `none` (to indicate one side of the bound does not apply).
   < k <

Check Save

Part 2: Feedback with Delay

Consider the following system



1. Write the system function for the system above.

   The system function is represented by the numerator and denominator polynomials.

   Enter each coefficient as a Python arithmetic expression, possibly involving the parameter `k`. 0 is a valid answer.

   Checks in this problem are very slow, so you should minimize the number of checks.

   System function:

   numerator: R^2+ $R+$

   denominator: R^2+ $R+$

2. What are the poles for this system? Enter the real and imaginary parts in the boxes below.

If there are no poles, enter `none` in all the boxes. If there is one pole, enter a Python arithmetic expression expression (in term of the parameter `k`) in the top pair of boxes and `none` in the bottom pair of boxes. If there are two poles enter Python expressions in all four boxes.

You can use `sqrt(...)` in your expressions to represent the positive square root, use `-sqrt(...)` for the negative square root. Enter poles with positive square roots in the top boxes and with negative square roots in the bottom boxes.

	real part	imaginary part
pole 1		
pole 2		

3. For what real values of `k` is this system stable (consider a pole with magnitude 1 not stable)? Enter a number, `Inf` for infinity or `-Inf` for negative infinity or `none` (to indicate one side of the bound does not apply).
   < k <

Check Save

Part 3: Enable Submit

Current time is: **4/11/2011, 12:17pm**

Click Submit before: **3/3, 9:50am**

Enter Done below

and click Submit.

If this problem is submitted past the due time, this subproblem will be marked incorrect.

Check

This is a multi-part problem, each part has its own Save and Check buttons but there is ONLY ONE Submit button for the WHOLE problem. Finish working on all the parts before you click on Submit.

When you are finished with the problem... Submit

6.01SC Introduction to Electrical Engineering and Computer Science

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